

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CONSERVATION PRACTICE STANDARD**  
**RESIDUE AND TILLAGE MANAGEMENT**  
**MULCH TILL**

(Ac.)

**CODE 345**

**DEFINITION**

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year round, while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled prior to planting.

**PURPOSE**

- ◆ Reduce sheet and rill erosion.
- ◆ Maintain or improve soil condition.
- ◆ Increase plant-available moisture.
- ◆ Provide food and escape cover for wildlife.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all cropland and other land where crops are planted. If all tillage is mulch, this practice will address the Conservation Crop Rotation (Code 328) standard. If other forms of tillage are used, address the whole rotation with Conservation Crop Rotation (Code 328).

This practice includes tillage methods commonly referred to as mulch tillage or chiseling and disking. It applies to stubble

mulching on summer-fallowed land, to tillage for annually planted crops, and to tillage for planting perennial crops.

It also includes some planting operations such as hoe drills, air seeders, and “no-till” drills that disturb a large percentage of the soil surface during the planting operation.

**CRITERIA**

**General Criteria Applicable to All Purposes**

Uniformly distribute on the soil surface loose residue to be retained on the field. Combines shall be equipped with spreaders capable of redistributing residue over at least 80 percent of the working width of the header.

Residue shall not be burned. Tillage and planter implements shall be equipped to operate through plant residues without clogging and to maintain residue on or near the soil surface.

**Additional Criteria to Reduce Sheet and Rill Erosion**

The amount of randomly distributed surface residue needed and the amount of surface soil disturbance allowed to reduce erosion to the planned soil loss objective shall be

determined using the current approved water erosion prediction technology (RUSLE2). Calculations shall account for the effects of other practices in the management system.

#### **Additional Criteria to Maintain or Improve Soil Condition**

An evaluation of the cropping system using the current approved soil conditioning index (RUSLE2) procedure shall result in a positive trend.

#### **Additional Criteria to Increase Plant Available Moisture**

**Reducing Evaporation from the Soil Surface.** A minimum of 2,000 pounds per acre or 60 percent surface residue cover shall be maintained throughout the year.

#### **Additional Criteria to Provide Food and Escape Cover for Wildlife**

The amount of residue and height of stubble needed to provide cover shall be determined using the Tennessee Habitat Evaluation Procedure. Residues shall not be removed unless determined by the Habitat Evaluation Procedure that it would not adversely affect habitat values. Stubble shall be maintained standing over winter. Delay tillage until spring in order to maintain waste grain on the soil surface during winter.

Harvest or tillage operations that disturb or cover the entire field shall not be performed during the nesting and brood-rearing period of the target species.

### **CONSIDERATIONS**

**General** - Removal of crop residue, such as by baling or grazing, can have a negative impact on resources. These activities should not be performed without full evaluation of

impacts on soil, water, animal, plant, and air resources.

Mulch till may be practiced continuously throughout the crop sequence or may be managed as part of a residue management system that includes other tillage methods such as no till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Suitability Rating.

Production of adequate amounts of crop residue necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and row spacing.

A field border planted to permanent vegetation can:

- allow unobstructed turning for equipment;
- eliminate unproductive end rows;
- provide food and escape cover for wildlife;
- provide travel lanes for farming operations.

***Increasing Soil Organic Matter Level and Reducing CO<sub>2</sub> Loss from the Soil*** – Where improving soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer.

CO<sub>2</sub> loss is directly related to the volume of soil disturbed, the intensity of the disturbance, and the soil moisture content and soil temperature at the time the disturbance occurs. The following

guidelines can make this practice more effective:

- Shallow soil disturbance (1-3 inches) releases less CO<sub>2</sub> than deeper operations.
- When deep soil disturbance is performed such as by subsoiling or fertilizer injection, make sure the vertical tillage slot created by these implements is closed at the surface.
- Planting with a single-disk opener no-till drill will release less CO<sub>2</sub> than planting with a wide-point hoe/chisel opener air seeder drill.
- Soil disturbance that occurs when soil temperatures are below 50°F. will release less CO<sub>2</sub> than operations done when the soil is warmer.

#### ***Increasing Plant-available Moisture –***

Although not a big factor in Tennessee, the effectiveness of stubble to trap snow increases with stubble height. Increasing the stubble height beyond the minimum required will increase the amount of snow trapped.

Variable height stubble patterns may be created to further increase snow trapping and storage.

Tillage and planting operations done on the contour will help slow overland flow and increase infiltration, thus increasing the potential for increased water storage in the root zone.

***Providing Food and Escape Cover for Wildlife -*** Avoid disturbing standing stubble or heavy residue during the nesting season for ground-nesting species.

Forgoing fall shredding or tillage operations will maximize the amount of wildlife food and cover during critical winter months.

Leaving rows of unharvested crop standing at intervals across the field or adjacent to permanent cover will enhance the value of residues for wildlife food and cover. Leaving unharvested crop rows for two growing seasons will further enhance the value of these areas for wildlife.

## **PLANS AND SPECIFICATIONS**

Prepare specifications for establishment and operation of this practice for each field or treatment unit according to the Criteria, Considerations, and O&M described in this standard. Specifications outlined in the Statement of Work (345) shall be recorded using approved specification sheets, job sheets, narrative statements in the conservation plan, or other acceptable documentation.

## **OPERATION AND MAINTENANCE**

Maintain all equipment essential for successful mulch-till planting and crop production. Service and repair equipment as needed. Clean and calibrate seeding and spray equipment before desired planting date. Clean all equipment before storing.

## **REFERENCES**

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